DOCUMENT RESUME

ED 168 839 SE 026 917

| | |
|---|---|
| TITLE | Mathematical Problem Solving Project Technical Report III: Module Development and Formative Evaluation. Appendix A - Evaluation Instruments and Forms. |
| INSTITUTION | Indiana Univ., Bloomington. Mathematics Education Development Center. |
| SPONS AGENCY | National Science Foundation, Washington, D.C. |
| PUB DATE | May 77 |
| GRANT | NSF-PES-74-15045 |
| NOTE | 17p.; For related documents, see SE 026 911-934 |
| EDRS PRICE | MF01/PC01 Plus Postage. |
| DESCRIPTORS | *Educational Research; Elementary Education; *Elementary School Mathematics; *Formative Evaluation; *Mathematics Education; *Problem Solving; *Program Evaluation; Questionnaires; Units of Study |
| IDENTIFIERS | *Mathematical Problem Solving Project |

ABSTRACT

These instruments were used in the evaluation of the problem-solving modules used in the Mathematical Problem Solving Project "Module Development and Formative Evaluation." Forms presented are: (1) teacher's instruction sheet-evaluation; (2) time record-instructional booklet; (3) time record-problem deck; (4) lesson rating form; (5) teacher debriefing questionnaire, instructional booklet; (6) inservice meetings, discussion questions. (MP)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

ED168839

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

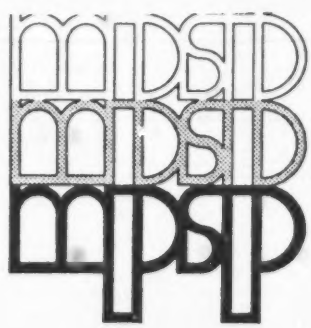
"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
John F. LeBlanc
George Immerzeel
David W. Wells
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

TECHNICAL REPORT III: Module Development and Formative Evaluation

APPENDIX A - Evaluation Instruments and Forms

1. Teacher's Instruction Sheet - Evaluation ..... III A-1
2. Time-Record, Instructional Booklet ..... III A-2
3. Time-Record, Problem Deck ..... III A-3
4. Lesson Rating Form ..... III A-4
5. Teacher Debriefing Questionnaire, Instructional Booklet ..... III A-5
6. In-Service Meetings, Discussion Questions ..... III A-12

# MATHEMATICAL PROBLEM SOLVING PROJECT



A Project of the
MATHEMATICS EDUCATION DEVELOPMENT CENTER
Project Supported by
National Science Foundation Grant PES74-15045

SE 026 917

MATHEMATICAL PROBLEM SOLVING PROJECT

TEACHER'S INSTRUCTION SHEET-EVALUATION

An important aspect of the Mathematical Problem Solving Project is the evaluation of the problem solving modules. We would like to have your responses to several areas of the evaluation.

1. Time Record - Instructional Booklet See attached form

2. Time Record - Problem Deck See attached form

3. Comments and Recommendations on the Lessons Space is provided in the teacher's edition for any comments and recommendations you have. There are several specific questions which we have about each lesson.

   (1) Does the lesson give adequate emphasis to each objective?
   (2) Was the lesson well organized?
   (3) Did the students find the lesson easy to use?
   (4) Many other questions might occur to you.

4. Lesson Rating Form See attached form

5. Comments and Recommendations on the Problem Deck Write any comments and recommendations you have on the Problem Deck pages. There are several specific questions we have about the problem deck. For example, what were the students' reactions to the problems in the deck?

6. Teachers' Debriefing Questionnaires These forms are not included in this packet. They will be distributed and completed at inservice programs after you finish different phases of the module. You will be asked to respond to specific questions and asked for suggestions for improving the module.

7. Posttest (quiz) A short quiz has been developed to help us determine the effectiveness of the booklet and problem deck. This quiz is not a measure of your teaching effectiveness and will not be used as such!

We are looking forward to receiving your comments and suggestions.

Thank you.

Project Development Staff

MPSP

TIME RECORD - INSTRUCTIONAL BOOKLET

Module_____ Teacher_____

Length (in minutes) of your regular mathematics period_____

Day 1:

Date:_____

Time:
Start_____
End_____
Total_____

Pages covered:_____

Day 2:

Date:_____

Time:
Start_____
End_____
Total_____

Pages covered:_____

Day 3:

Date:_____

Time:
Start_____
End_____
Total_____

Pages covered:_____

Day 4:

Date:_____

Time:
Start_____
End_____
Total_____

Pages covered:_____

Day 5:

Date:_____

Time:
Start_____
End_____
Total_____

Pages covered:_____

Day 6: *

Date:_____

Time:
Start_____
End_____
Total_____

Pages covered:_____

Pretest (if used)

Date:_____

Total time:_____

Posttest

Date:_____

Total time:_____

* (If more days are needed use the back of this sheet.)

## TIME RECORD - PROBLEM DECK

Module_____ Teacher_____

| | | | | | | |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |

1. Describe the procedures, including grouping of students, you used for implementing the problem deck.

_____

_____

_____

_____

2. Describe the methods you used for monitoring student performance on the problem deck.

_____

_____

_____

_____

3. Please write any additional comments about the problem deck on the back of this page.

MPSP

LESSON RATING FORM

Module_____

Teacher_____

1. How appropriate is the lesson for the ability level of your students? (Circle one for each lesson.)

| | Inappropriate | | | | Appropriate |
|---|---|---|---|---|---|
| Lesson 1 | 1 | 2 | 3 | 4 | 5 |
| Lesson 2 | 1 | 2 | 3 | 4 | 5 |
| Lesson 3 | 1 | 2 | 3 | 4 | 5 |
| Lesson 4 | 1 | 2 | 3 | 4 | 5 |
| Lesson 5 | 1 | 2 | 3 | 4 | 5 |

2. How appropriate is the lesson for the overall purpose of this module?

| | Inappropriate | | | | Appropriate |
|---|---|---|---|---|---|
| Lesson 1 | 1 | 2 | 3 | 4 | 5 |
| Lesson 2 | 1 | 2 | 3 | 4 | 5 |
| Lesson 3 | 1 | 2 | 3 | 4 | 5 |
| Lesson 4 | 1 | 2 | 3 | 4 | 5 |
| Lesson 5 | 1 | 2 | 3 | 4 | 5 |

3. How useful were the teacher notes for each lesson?

| | Inappropriate | | | | Appropriate |
|---|---|---|---|---|---|
| Lesson 1 | 1 | 2 | 3 | 4 | 5 |
| Lesson 2 | 1 | 2 | 3 | 4 | 5 |
| Lesson 3 | 1 | 2 | 3 | 4 | 5 |
| Lesson 4 | 1 | 2 | 3 | 4 | 5 |
| Lesson 5 | 1 | 2 | 3 | 4 | 5 |

TEACHER DEBRIEFING QUESTIONNAIRE, INSTRUCTIONAL BOOKLET

| OBJECTIVES | Yes | No | Not Sure |
|---|---|---|---|
| 1. Are the objectives clearly stated? | ___ | ___ | _____ |
| 2. Are the objectives consistent with one another? | ___ | ___ | _____ |
| 3. Is appropriate emphasis given to each objective? | ___ | ___ | _____ |
| 4. Does the content adequately cover the material specified in the objectives? | ___ | ___ | _____ |
| **DISPLAY AND FORMAT** | | | |
| 5. Is the format appropriate for the intended population in terms of ease of use? | ___ | ___ | _____ |
| 6. Does the display format avoid a crowded appearance? | ___ | ___ | _____ |
| 7. (If a student booklet is used) Is the sentence structure and vocabulary clear, simple, and straightforward? | ___ | ___ | _____ |
| 8. (If a student booklet is used) Are the instructions to the learner complete, clear, and easy to follow? | ___ | ___ | _____ |
| **CONTENT ANALYSIS** | | | |
| 9. Have adjustments been made to the instructional material to accommodate learners of different aptitudes? | ___ | ___ | _____ |
| 10. Is the content free from factual and technical errors? | ___ | ___ | _____ |
| 11. Does the product avoid overemphasizing topics which do not merit detailed treatment? | ___ | ___ | _____ |

| | Yes | No | Not Sure |
|---|---|---|---|
| 12. Does the product begin at a point which is familiar to the learner? | ___ | ___ | _____ |
| 13. Is the product organized for the sequential development of concepts/skills it is designed to teach? | ___ | ___ | _____ |
| 14. Does the product avoid extreme variations in the difficulty of the content? | ___ | ___ | _____ |
| 15. (If a student booklet is used) Are content examples interesting and illustrations attractive and well-chosen? | ___ | ___ | _____ |
| 16. (If a student booklet is used) Are examples and illustrations drawn from activities related to the probable interests of your students? | ___ | ___ | _____ |
| 17. Does the product avoid "talking down" to the learner? | ___ | ___ | _____ |

Describe the grouping procedure(s) you used for the instructional booklet?

DISCUSSION QUESTIONS, INSTRUCTIONAL BOOKLET

1. What comments do you have with respect to the amount of time required to use the instructional booklet? (Probe: suggestions for revising the booklet with respect to length, viz., additions and deletions)
2. (If a student booklet was used) Did the students seem to enjoy the format (including artwork) of the booklet? (Probe: examples)
3. Is the booklet self-contained? (Probe: where additional explanation is required; ambiguous material)
4. After the first phase of the module did you observe any changes in your students with respect to their:
   (a) attitudes about problem solving?
   (b) abilities to solve problems?
   (c) others?
5. What were your students' attitudes during this phase of the module? (Probe: willingness, perseverance, changes in attitude, attitudes toward each lesson)
6. Is there any ambiguity with respect to the objectives for each lesson? (Probe: specific lessons)
7. What additional suggestions do you have for the people who are going to revise the instructional booklet?
8. Other questions might occur to you.

DISCUSSION QUESTIONS, PROBLEM DECK

1. Ability levels and interests
   a. Did students of certain ability levels use the problem deck more than others?
   b. Does the deck include an adequate number of problems for students of low ability? high ability?
   c. Did the students have any difficulty finding problems appropriate for their interests? Explain.
2. Relationship of instructional booklet and the problem deck
   a. Are the problems consistent with the instructional booklet? (Probe: similarities and differences)
   b. What was the effect of the instructional booklet on the students' performance on the problem deck? Explain.
   c. Would the problem deck be more or less effective it it were used before the instructional booklet? Explain.
3. Preferences
   a. If students selected their own problems did they choose the more difficult problems? easy problems?
   b. Did the students show any preference for real-world problems, puzzle problems, or some other identifiable type (e.g., content)?
4. Time
   a. About how long did a student (or team) spend on a problem card?
   b. How many days do you feel are the right length of time to use the problem deck?
   c. Did the students ask to use the cards during "free time?" (Probe: How frequently? How many students?)

5. Attitudes

   a. Did your students seem to enjoy working with the problem deck? Explain.

   b. Did the students seem to enjoy working with "cards?" (Probe: art work)

6. Others

   a. Was there any difficulty with students waiting for answers, instructions, and/or directions when finished with a problem? Explain.

   b. (If hints were on the cards) Were the hints used on the cards that have them? Would more hints be desirable? Explain.

7. Other questions might occur to you

## MODULE DEBRIEFING - DISCUSSION QUESTIONS

Responses to these discussion questions should be obtained verbally at this session.

1. Considering the entire module, what seems to have been most successful and what least successful?
2. What in the students' performance pleased you most? disappointed you?
3. Were there groups of students who didn't respond well to the module and its content?
4. Did the students' attitudes vary during the different phases of the module? (Probe: specific examples)
5. Do you have any comments and suggestions with respect to the time requirements for the module related to
   a. teacher preparation?
   b. student classroom work?
6. a. Did you supplement the module in any way by creating different activities or using other materials? (Probe: examples)
   b. What supplementary instructional materials (if any) would be useful (e.g., transparencies, slide-tapes, manipulatives)?
7. Was the amount of instruction provided by the module sufficient for your students to meet the objectives of the module?
8. What would you want to do differently if you were to teach this module again?

9. What suggestions would you offer a teacher who was about to use the module for the first time?

10. What final recommendations do you have for revising the module?

## TEACHER INTERVIEW QUESTIONNAIRE

The interview with the teachers should be done informally. Below is the suggested sequence and questions to be asked.

Section I: Setting the context for the interview

1. During the past several weeks, we at Indiana have been going over all of the evaluation data from the last trial of the modules.
2. As a result of examining the evaluation data, we have identified a few areas which perhaps were not discussed during the in-service sessions and/or areas which we would like to get a better feel for.
3. There are three general reasons for the interviews we are having today:
   (a) To provide additional details of what happened during the trial;
   (b) To identify successes and failures, strong and weak points of the module;
   (c) To identify your ideas about the MPSP and the two modules you have tried.
4. We have listened to recordings of some of your meetings and have gotten a <u>great</u> deal of valuable feedback. There were some points that we heard on the tapes or saw in the written feedback that we want to pursue further, so my questions might sound a bit redundant at times.
5. With your permission, I would like to record our talk.
6. Do you have any questions? Please feel free to ask any questions at any time.

SECTION II: INFORMATION RELATED TO SECOND MODULE TRIAL

| Question | Related Probe Topics |
|---|---|
| 1. To help me better understand what you will be saying, could you tell me what your class is like this year? | - ability level<br>- degree of teacher dependence<br>- (SES) background<br>- general deportment |
| 2. How do you organize a typical day? | - range of grouping procedures<br>- range of teacher: roles<br>modes<br>strategies, etc.<br>- specifically, what does math typically look like |
| 3. How did you organize your class for the use of the instructional booklet? | - grouping<br>what way(s)?<br>change overtime? } why?<br>- teacher<br>what did (s)he do?<br>change overtime? } why?<br>- special external factors during use? (e.g., snow days)<br>did they have an effect?<br>- timing<br>one lesson/day?<br>on consecutive days?<br>length of sessions<br>- RECOMMENDATIONS |
| 4. How did you organize your class for use of the problem deck? | - grouping<br>what way(s)?<br>change overtime? } why?<br>- teacher<br>what did (s)he do?<br>change overtime? } why?<br>- special external factors during use?<br>did they have an effect?<br>- timing<br>one lesson/day?<br>consecutive days?<br>length of sessions<br>- RECOMMENDATIONS |

| Question | Related Probe Topics |
|---|---|
| 5. Now that you've completed the whole module, would you do it the same way again? | (for each respective part:)<br>- grouping?<br>- teacher role?<br>- timing |
| 6. How did it go when you moved from the instructional booklet to the problem deck? | content<br>- adequate preparation in booklet?<br>- feasability of: problem deck alone?<br>problem deck ⇒ booklet?<br>booklet alone?<br><br>management<br>- did kids understand how to use materials?<br>- were kids able to adjust to grouping changes (if any)? |
| 7. What do you think the module was designed to do? | - is goal reasonable for kids?<br>specifically, were kids ready for these materials?<br>- was content consistent with goal?<br>- do you think kids reached goal?<br>all kids? some? none?<br>evidence of achievement or lack of<br>* was sequence of lessons reasonable?<br>- RECOMMENDATIONS |
| 8. What did you think of these materials? | - appeal across ability levels?<br>- differences between booklet and deck<br>- differences between module and regular math re: content<br>difficulty level<br>- RECOMMENDATIONS |
| 9. What was most / least successful in the module? | |

SECTION III: INFORMATION RELATED TO THE TOTAL PROGRAM

| Question | Related Probe Topics |
|---|---|
| 1. Could students do better on the second module after having the first? | - familiarity with program<br>- do you feel better about the program?<br>- most successful/least successful idea<br>- were students more able to solve problems after having two modules rather than just one? |
| 2. You have given two modules now, each with somewhat different formats. Which worked better for you? | - which better for kids?<br>- RECOMMENDATIONS |
| 3. Do you think your students had the prerequisite knowledge and/or skills to learn (the first) module? | |
| 4. Was the time spent on these materials worth it? | - in place of other math?<br>- re: effects on math and/or other subjects |
| 5. Were there reactions to these materials? | - comments from parents (and kids)<br>- comments from non-participating teachers, principal, etc. |
| 6. Did you have adequate support for your effort? | - aid from MPSP people<br>- instructional (material) aids? e.g., transparencies, etc.<br>- RECOMMENDATIONS |
| 7. Did your kids grow? Along what dimensions? | |